

spacing the means from said surface to generate said electrical signal from said fluid surface;

directing said signal along a line toward the fluid surface, wherein said signal has an unobstructed path to the fluid surface;

detecting the signal reflected from the fluid surface, wherein the reflected signal travels through an unobstructed path; and

determining from the directed and reflected signal the Doppler frequency shift therebetween as a measure of the velocity of the fluid surface.

13. (NEW) A non-invasive method for continuously measuring the volumetric flow of a free liquid flowing in a predetermined direction in an open channel or flume of a predetermined shape and a predetermined cross-section comprising the steps of:

generating an electrical signal adapted to reflect from said liquid surface using a means to generate said electrical signal;

spacing the means to generate said electrical signal from said liquid surface;

directing said signal along a line through an unobstructed path toward said liquid surface;

detecting said signal reflected from said liquid surface;

determining from said directed and reflected signal a Doppler frequency shift therebetween as a measure of the velocity of said liquid surface;

measuring a depth of said liquid travelling through the channel at said predetermined cross-section; and

determining from the velocity of said liquid surface and the depth of said liquid a volumetric flow of said liquid.